ADDENDUM NO. 5

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES

PROJECT NAME: **Market Street Realignment**

DATE: 2/11/2013

This addendum should be included in and be considered part of the plans and specifications for the Market Street Realignment Project. The contractor shall be required to sign an acknowledgement of the receipt of this addendum and submit it with their bid.

PROJECT NO.: **40-00300**

GENERAL:

- **Receipt of Addendum No. 5 Acknowledgement**

PROPOSAL / SPECIFICATION UPDATES: The documents listed below are to replace those previously issued.

- **025 Unit Pricing Form.** This update has updated illumination quantities.

- **Updated Special Specifications**
  - **SAWS Technical Specification 332640.** Updated to match Steel Pipe Classification.
  - **SAWS Technical Specification 336313.** Updated requirements for Steel Pipe Classification and Wall Thicknesses.

CITY OF SAN ANTONIO
DEPARTMENT OF CAPITAL IMPROVEMENTS MANAGEMENT SERVICES
CONTRACT SERVICES DIVISION

RECEIPT OF ADDENDUM NUMBER **5** IS HEREBY ACKNOWLEDGED FOR PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF **Market Street Realignment** FOR WHICH BIDS WILL BE OPENED ON WEDNESDAY, FEBRUARY 12, 2013 AT 2:00 P.M. C.S.T.

THIS ACKNOWLEDGEMENT MUST BE SIGNED AND RETURNED WITH THE BID PACKAGE.

Company Name: _____

Address: _____

City/State/Zip Code: _____

Date: _____

Signature: _____

Print Name/Title: _____

CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	100.1			MOBILIZATION	LS	1			
	100.2			INSURANCE & BOND	LS	1			
	101.1			PREPARATION OF RIGHT OF WAY	LS	1			
	106.1			BOX CULVERT EXCAVATION & BACKFILL	CY	3817			
	202.1			PRIME COAT	GAL	807			
	203.1			TACK COAT	GAL	2785			
	205.3			HMA PAVEMENT, TYPE C (2" COMP. DEPTH)	SY	10913			
	208.1			SALV, HAUL & STKPL RCL APH PV (2")	SY	34457			
	209.1			CONCRETE PAVEMENT (BUS PAD) (10")	SY	178			
	307.1			CONCRETE STRUCTURE (MISCELLANEOUS)	CY	7.7			
	308.1			DRILLED SHAFTS (18")	LF	512			
	308.1			DRILLED SHAFTS (24")	LF	153			
	308.1			DRILLED SHAFTS (30")	LF	78			
	308.1			DRILLED SHAFTS (36")	LF	49			
	308.1			DRILLED SHAFTS (48")	LF	50			
	309.1			PRECAST REINFORCED CONCRETE CULVERT (4' x 3')	LF	152			
	309.1			PRECAST REINFORCED CONCRETE CULVERT (4' x 4')	LF	486			
	309.1			PRECAST REINFORCED CONCRETE CULVERT (5' x 3')	LF	110			
	309.1			PRECAST REINFORCED CONCRETE CULVERT (6' x 4')	LF	393			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(18" DIA)	LF	7			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(24" DIA)	LF	1190			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(30" DIA)	LF	304			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(36" DIA)	LF	461			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(42" DIA)	LF	303			
	401.1			REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)	LF	60			
	403.1			JUNCTION BOX 4'X4'X4'	EA	9			
	403.2			JUNCTION BOX 5'X5'X5'	EA	2			
	403.3			JUNCTION BOX 6'X6'X6'	EA	5			
	403.4			JUNCTION BOX 7'X7'X7'	EA	3			
	403.7			INLET TYPE I (COMPLETE)(10FT)	EA	7			
	403.91			INLET TYPE X-1	EA	2			
	403.92			INLET TYPE Y-1	EA	1			
	403.93			CI TYPE IL-C	EA	10			
	403.94			DOMED GRATE INLET (24")	EA	3			

Description Codes: SS=Special Specification; COSA=City of San Antonio Specification Item; SAWS=San Antonio Water System Specification Item

CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	403.95			51' X 8" TRENCH DRAIN	EA	1			
	403.96			MANHOLES (STAGE II)	EA	10			
	410.2			GRAVEL SUBGRADE FILLER (100 CY< X < 1,000 C.Y.)	CY	565			
	413.1			FLOWABLE BACKFILL (LOW STRENGTH)	CY	3325			
	500.4			CONCRETE CURB & GUTTER (> 1,000 L.F.)	LF	9490			
	502.1			CONCRETE SIDEWALKS(1,000 S.Y.< X <10,000S.Y.)	SY	8676			
	503.1			PORTLAND CEMENT CONCRETE DRIVEWAY	SY	200			
	505.1			CONCRETE RIPRAP (5" THICK) (< 100 S.Y.)	SY	8.6			
	506.1			CONCRETE RETAINING WALLS-COMB. TYPE (< 20 C.Y.)	CY	10			
	507.2A			TEMPORARY CHAIN LINK WIRE FENCE (6' HIGH)	LF	2300			
	520.1			HYDROMULCH	SY	28862			
	524			CONCRETE STEPS	CY	3			
	531			OBJECT MARKER ASSEMBLY	EA	15			
	531.13R			R3-7R RIGHT LANE MUST TURN RIGHT (30" X 30")	EA	1			
	531.14SPL			R3-8SPL LANE-USE CONTROL SPECIAL (VARIES)	EA	1			
	531.17			R4-7 KEEP RIGHT (24" X 30")	EA	1			
	531.18			R5-1 DO NOT ENTER (30" X 30")	EA	4			
	531.19			R6-1R ONE WAY (36" X 12")	EA	1			
	531.43			W1-7T LARGE ARROW (48" X 24")	EA	1			
	531.49			W9-2L LANE ENDS MERGE LEFT (30" X 30")	EA	1			
	531.7			R3-1R NO RIGHT TURN (24" X24")	EA	1			
	531.D11-1			D11-1 BIKE ROUTE (24" X 18")	EA	12			
	531.D1-2			D11-2 DESTINATION (42" X 30")	EA	1			
	531.M1-1			M1-1 INTERSTATE ROUTE MARKER (24" X 24")	EA	1			
	531.M1-4			M1-4 US ROUTE MARKER (24" X 24")	EA	1			
	531.M3-1			M3-1 CARDINAL DIRECTION NORTH (24" X 12")	EA	2			
	531.M4-14			M4-14 BEGIN (12" X " 6")	EA	4			
	531.M4-6			M4-6 END (12" X 6")	EA	1			
	531.M6-1			M6-1 BIKE ARROW SIGN (12" X 9")	EA	1			
	531.M6-2L			M6-2 DIRECTIONAL ARROW LEFT (21" X 15")	EA	2			
	531.M6-2R			M6-2R BIKE ARROW SIGN (12" X 9")	EA	1			
	531.M6-4			M6-4 BIKE ARROW SIGN (12" X 9")	EA	1			
	531.R3-5bP			R3-5bP LEFT LANE (PLAQUE) (30" X 12")	EA	1			

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	531.R3-5L			R3-5L LEFT TURN ONLY (30" X 36")	EA	5			
	531.R3-5R			R3-5R RIGHT TURN ONLY (30" X 36")	EA	3			
	531.R3-6L			R3-5R LEFT AND THRU (30" X 36")	EA	1			
	531.R5-1A			R5-1A WRONG WAY (42" X 30")	EA	4			
	531.R5-1B			R5-1B BICYCLE WRONG WAY (12" X 18")	EA	1			
	531.R5-2			R5-2 NO TRUCKS (24" X 24")	EA	1			
	531.R9-6			R9-6 BICYCLE REGULATORY YIELD TO PEDS (12" X "18")	EA	2			
	531.R9-7			R9-7 SHARED USE PATH RESTRICTION (12" X 18")	EA	1			
	531.R10-11A			R10-11A NO TURN ON RED (30" X 36")	EA	5			
	531.R10-6			R10-6 STOP HERE ON RED (24" X 36")	EA	2			
	531.SPL			SPECIAL SIGN (18" X 18")	EA	2			
	531.W12-2A			W12-2A LOW CLEARANCE (78" X 24")	EA	1			
	531.W3-3			W3-3 ADVANCED TRAFFIC CONTROL (30" X 30")	EA	1			
	531.W4-3L			W4-3L ADDED LANE (36" X 36")	EA	1			
	535			24 INCH WIDE YELLOW LINE	LF	62			
	535.1			4 INCH WIDE YELLOW LINE	LF	2577			
	535.12			WORD "ONLY"	EA	10			
	535.16			STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	28			
	535.17			BICYCLE RIDER SYMBOL	EA	28			
	535.2			4 INCH WIDE WHITE LINE	LF	5464			
	535.4			8 INCH WIDE WHITE LINE	LF	1959			
	535.5			12 INCH WIDE WHITE LINE	LF	468			
	535.7			24 INCH WIDE WHITE LINE	LF	1206			
	535.8			RIGHT WHITE ARROW	EA	10			
	535.9			LEFT WHITE ARROW	EA	11			
	535.XX	SS		REFL PAV MRK TY I BIKE LANE(G)(SLD)(100MIL)	SF	3244			
	537.6			TRAFFIC BUTTON TYPE I-C	EA	37			
	537.8			TRAFFIC BUTTON TYPE II-A-A	EA	58			
	537.9			TRAFFIC BUTTON TYPE II-C-R	EA	220			
	540.6			CONSTRUCTION EXITS (INSTALL/REMOVE)	SY	340			
	540.9			TEMPORARY SEDIMENT CONTROL FENCE	LF	970			
	540.10			GRAVEL FILTER BAGS FOR EROSION CONTROL	LF	988			
	550.1			TRENCH EXCAVATION SAFETY PROTECTION	LF	4799			

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	615.1			TRAFFIC SIGNAL CONTROLLER ASSEMBLY (TYPE 332 CABINET)	EA	4			
	618.1			CONDUIT (2 INCH/PVC SCHEDULE 40)	LF	602			
	618.2			CONDUIT (3 INCH/PVC SCHEDULE 40) (BORE)	LF	854			
	618.2			CONDUIT (3 INCH/PVC SCHEDULE 40)	LF	2164			
	620.1			ELECTRICAL CONDUCTORS (NO. 6)(BARE)	LF	37			
	620.2			ELECTRICAL CONDUCTORS (NO. 8)(BARE)	LF	3538			
	620.3			ELECTRICAL CONDUCTORS (NO. 6)(INSULATED)	LF	74			
	624.4			GROUND BOXES TYPE D (162922)	EA	25			
	628.1			ELECTRICAL SERVICES (PER INSTALLATION)	EA	4			
	633.1			BATTERY BACKUP SYSTEM	EA	4			
	655.1			TYPE 332 CONTROLLER FOUNDATION	EA	4			
	680.1		680SPL	INSTALLATION OF HIGHWAY TRAFFIC SIGNALS [ISOLATED]	EA	3			
	680.3		680SPL	INSTALLATION OF HIGHWAY TRAFFIC SIGNALS [SYSTEM]	EA	1			
	682.1			INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (3 SECOND)	EA	41			
	682.2			INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (4 SECOND)	EA	3			
	682.3			INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (5 SECOND)	EA	3			
	683.1			LED COUNTDOWN PEDESTRIAN MODULE	EA	26			
	684.1			TRAFFIC SIGNAL CABLES (TYPE C)(14 AWG)(CONDUCTOR NO. 4)	LF	2976			
	684.1			TRAFFIC SIGNAL CABLES (TYPE A)(14 AWG)(CONDUCTOR NO. 9)	LF	11368			
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(2 ARM 44-24')	EA	1			
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(2 ARM 50-36')	EA	2			
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 24')	EA	2			
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 32')(LUM)	EA	3			
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 36')(LUM)	EA	1			

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	686.1			INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 44')(LUM)	EA	1			
	687.1			PEDESTAL POLE ASSEMBLY	EA	20			
	688.2			PEDESTRIAN DETECTORS [2 INCH PUSH BUTTON]	EA	45			
	693.1			INTERNALLY LIGHTED STREET NAME SIGNS [TYPE/SIZE]	LF	14			
	695.3			EMERGENCY PREEMPTION DETECTOR	EA	11			
	695.4			EMERGENCY PREEMPTION DETECTOR CABLE	EA	2317			
	696.1			RADAR ADVANCE DETECTION DEVICE (RADD)	EA	11			
	696.2			RADAR ADVANCE DETECTION DEVICE (RPDD)	EA	14			
	696.3			RADD COMMUNICATION AND POWER CABLE	LF	1778			
	696.3			RPDD COMMUNICATION AND POWER CABLE	LF	3190			
	CoSA SPECIAL SPECIFICATION ITEMS								
	9001	SS		GROUT COLUMNS	LF	2353			
	9002.1	SS		TEMPORARY SUSPENSION OF WORK IN WHOLE	DAY	20			
	9002.2	SS		TEMPORARY SUSPENSION OF WORK IN PART	DAY	20			
	9003.1	SS		CAST CONCRETE SEAT (CUSTOM W/INTEGRAL COLOR)	EA	9			
	9003.2b	SS		CAST CONCRETE BENCH, 4' LONG (CUSTOM W/INTEGRAL COLOR)	EA	10			
	9003.3	SS		TRASH/RECYCLING RECEPTACLES	EA	8			
	9003.4	SS		BOLLARDS (FAIRWEATHER, 3' HIGH)	EA	3			
	9003.5	SS		BIKE RACKS (MAGLIN MBR200)	EA	8			
	9003.6	SS		TREE GUARDS (VS IRONSITES, S-6)	EA	32			
	9004A.1	SS		CONCRETE SEATWALL (COLOR, FINISH, JOINT SEALER, AND ANTI-GRAFFITI)	LF	101			
	9004A.2	SS		SPECIAL PAVING #1 UPCHARGE	SF	10822			
	9004A.3	SS		SPECIAL PAVING #2 UPCHARGE	SF	1433			
	9004A.4	SS		SPECIAL PAVING #3 UPCHARGE	SF	324			
	9004A.5	SS		SPECIAL PAVING #4 UPCHARGE	SF	288			
	9004A.6	SS		SPECIAL PAVING #5 (ARTIST DESIGNED PAVING)	SF	168			
	9004B	SS		ANTI-GRAFFITI COATING	SF	1954			
	9005.1	SS		CRUSHED STONE AT TREE WELLS AND PAVING DIVIDERS	SF	2736			
	9005.2	SS		GRAVEL SWALE	SF	444			

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	9005.3	SS		COBBLE DISSIPATORS AT STORMWATER INLETS	SF	265			
	9006.1	SS		WATER TAP AND METER (1" SIZE)	EA	1			
	9006.2	SS		BACKFLOW PREVENTION DEVICE WITH ENCLOSURE (1" SIZE):	EA	1			
	9006.3	SS		IRRIGATION BOOSTER PUMP SYSTEM:	EA	1			
	9006.4	SS		LANDSCAPE INJECTOR SYSTEMS:	EA	1			
	9006.5	SS		AUTOMATIC IRRIGATION CONTROLLER (2-WIRE CENTRAL CONTROL):	EA	1			
	9006.6	SS		CONTROL WIRE (2-WIRE):	LF	6710			
	9006.7	SS		IRRIGATION SLEEVES (MAINLINE):	LF	1376			
	9006.8	SS		IRRIGATION SLEEVES (LATERALS):	LF	1142			
	9006.9	SS		IRRIGATION SLEEVES (WIRES):	LF	1376			
	9006.10	SS		IRRIGATION PRESSURE MAINLINE (2-1/2" SIZE):	LF	3620			
	9006.11	SS		IRRIGATION PRESSURE MAINLINE (2" SIZE):	LF	3090			
	9006.12	SS		IRRIGATION ISOLATION GATE VALVES (2-1/2" SIZE):	EA	14			
	9006.13	SS		IRRIGATION ISOLATION GATE VALVES (2" SIZE):	EA	17			
	9006.14	SS		IRRIGATION QUICK COUPLING VALVE (1" SIZE):	EA	44			
	9006.15	SS		TREE ROOT WATERING SYSTEM (2 PER TREE):	EA	542			
	9006.16	SS		SUBSURFACE DRIP IRRIGATION:	SF	48328			
	9006.17	SS		REMOTE CONTROL VALVE:	EA	26			
	9006.18	SS		DRIP REMOTE CONTROL VALVE:	EA	31			
	9007.1	SS		TREES, 2.5" CALIPER	EA	68			
	9007.2	SS		TREES, 3" CALIPER	EA	130			
	9007.3	SS		TREES, 4" CALIPER	EA	73			
	9007.4-7	SS		SHRUBS AND GROUNDCOVER	SF	42680			
	9007.8a	SS		SOIL PREP + AMENDMENTS (SHRUB/GROUNDCOVER), 12-18" DEEP	SF	26557			
	9007.8b	SS		SOIL FOR TRENCHES	SF	1356			
	9007.8c	SS		SOIL FOR TREE WELLS	SF	2736			
	9007.9	SS		PLANTING AREA SHEET MULCH	SF	26557			
	9007.1	SS		SOIL PREP + AMENDMENTS (STORMWATER)	SF	21771			
	9007.11	SS		STORMWATER PLANTER SHEET MULCH	SF	21771			
	9007.12a	SS		TREE STAKES (9' REDDYSTAKE)	EA	130			
	9007.12b	SS		TREE STAKES (MEGASTAKE)	EA	73			

PROJECT NAME: MARKET STREET REALIGNMENT
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ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	9007.13	SS		SOIL FERTILITY TESTING	EA	12			
	9007.14	SS		SOIL FOOD WEB ANALYSIS TESTING	EA	12			
	9007.15	SS		LANDSCAPE MAINTENANCE, 12 MONTHS	EA	1			
	9008.1a	SS		PERF. PIPE AT STORMWATER PLANTER + TREE WELLS WITH TRENCHING & DRAIN ROCK	LF	3329			
	9008.1b	SS		SOLID PIPE AT TREE WELLS W/TRENCHING & DRAIN ROCK	LF	450			
	9008.1c	SS		CLEANOUTS FOR UNDERDRAIN LINES	EA	61			
	9009	SS		GEOGRID FOR BASE AND EMBANKMENT REINFORCEMENT	SY	22107			
	9010	SS		INS VALMONT 26 FT 2 IN TAVERN GREEN STREET LIGHT ASSEMBLY (INCLUDES POLE, BASE, AND ARM)	EA	78			
	9011	SS		INS GREENSTAR LED LUMINAIRE, GALAXY XD-- GLX30 MODEL, 68W	EA	59			
	9011	SS		INS GREENSTAR LED LUMINAIRE, GALAXY XD-- GLX48 MODEL, 109W	EA	19			
	9012	SS		INS LANDSCAPEFORMS 12 FT METALLIC BRONZE ALCOTT PEDESTRIAN LIGHT	EA	128			
	9013	SS		INS LANDSCAPEFORMS 3 FT 1 IN METALLIC BRONZE HAWTHORN BOLLARD LIGHT	EA	31			
	9014.3.1	SS		TRANSPORTATION TO DISPOSAL FACILITY (CLASS 2 NON-HAZ SOIL) (COSA)	EA	621			
	9014.3.2	SS		LANDFILL DISPOSAL (CLASS 2 NON-HAZ SOIL) (COSA)	EA	621			
	9014.3.3	SS		TRANSPORTATION TO DISPOSAL FACILITY (CLASS 2 NON-HAZ SOIL) (CPS)	EA	175			
	9014.3.4	SS		LANDFILL DISPOSAL (CLASS 2 NON-HAZ SOIL) (CPS)	EA	175			
	9014.6.1	SS		PREPARATION AND IMPLEMENTATION OF A SITE SPECIFIC HEALTH AND SAFETY PLAN	LS	1			
	9015	SS		VERTICAL CIRCULATOR	LS	1	$ 250,000.00	$ 250,000.00	
	9016.1	SS		CONCRETE STRUCTURE (STORM WATER PLANTER - 5'-6' WIDE)	LF	1870			
	9016.2	SS		CONCRETE STRUCTURE (STORM WATER PLANTER - 6'-7' WIDE)	LF	490			
	9016.4	SS		CONCRETE STRUCTURE (STORM WATER PLANTER - 8'-15' WIDE)	LF	670			
	9018.1	SS		ORNAMENTAL FENCE	LF	367			
	9018.2	SS		ORNAMENTAL GATE	EA	1			

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CITY OF SAN ANTONIO

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PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	9019.1	SS		PEDESTRIAN ENHANCEMENTS ON COMMERCE ST	LS	1	$ 600,000.00	$ 600,000.00	
	9020	SS		STREET LIGHT FOUNDATION	EA	79			
	9021.1	SS		GEOTECHNICAL BORINGS (25' TO 35') & SUP LTR RPT	LS	1			
	9021.2	SS		GEOTECHNICAL BORING, 35' DEEP	EA	1			
	9021.3	SS		GEOTECHNICAL BORING, ADD OR DEDUCT LENGTH	LF	20			
	814	SAWS		8" DI PIPE	LF	449			
	814	SAWS		30" DI PIPE	LF	449			
	TxDOT ITEMS								
	104	2009		REMOVING CONC (RIPRAP)	SY	2226			
	104	2011		REMOVING CONC (MEDIANS)	SY	165			
	104	2015		REMOVING CONC (SIDEWALKS)	SY	6374			
	104	2021		REMOVING CONC (CURB)	LF	6833			
	110	2001		EXCAVATION (ROADWAY)	CY	64583			
	132	2002	007	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	9990			
	160	2003		FURNISHING AND PLACING TOPSOIL (4")	SY	28862			
	247	2041		FL BS (CMP IN PLC)(TY A GR 1)(FNAL POS)	CY	1572			
	340	2011		D-GR HMA(METH) TY-B PG64-22	TON	118			
	340	2014		D-GR HMA(METH) TY-B PG70-22	TON	12053			
	340	2050		D-GR HMA(METH) TY-C PG70-22	TON	5750			
	342	2002		PFC (ASPHALT) PG76-22	TON	506			
	360	2002		CONC PVMT (CONT REINF - CRCP) (9")	SY	563			
	400	2008		CUT & RESTORING PAV (ASPH)	SY	669			
	403	2001		TEMPORARY SPL SHORING	SF	12,311			
	416	2001	001	DRILL SHAFT (18 IN)	LF	40			
	416	2003	001	DRILL SHAFT (30 IN)	LF	168			
	416	2004	001	DRILL SHAFT (36 IN)	LF	7,959			
	416	2006	001	DRILL SHAFT (48 IN)	LF	728			
	416	2016	001	DRILL SHAFT (SIGN MTS)(12 IN)	LF	21			
	416	2029	001	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	32			
	420	2003	002	CL C CONC (ABUT)	CY	52.7			
	420	2004	002	CL C CONC (BENT)	CY	182			
	420	2006	002	CL C CONC (RAIL FOUNDATION)	CY	15			
	420	2013	002	CL C CONC (MISC)	CY	27.88			

Description Codes: SS=Special Specification; COSA=City of San Antonio Specification Item; SAWS=San Antonio Water System Specification Item

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	420	2017	002	CL C CONC (BENT)(MASS PLACEMENT)	CY	298.3			
	420	2018	002	CL C CONC (FOOTING)(MASS PLACEMENT)	CY	124.6			
	420	2029	002	CL S CONC (SLAB)	CY	43.5			
	420	2031	002	CL S CONC (SHEAR KEY)	CY	14			
	420	2033	002	CL S CONC (APPR SLAB)	CY	41.7			
	422	2001		REINF CONC SLAB	SF	23,914			
	423	2001		RETAINING WALL (MSE)	SF	10,791			
	423	2012		RETAINING WALL (CAST-IN-PLACE)	SF	503			
	423	2013		RETAINING WALL (TIEBACK)	SF	13,930			
	423	2026		RETAINING WALL (CANT DRILL SHAFT)(FACIA)	SF	620			
	425	2006	001	PRESTR CONC BOX BEAM (4B20)	LF	318			
	425	2040		PRESTR CONC BOX BEAM (5B20)(SPL)	LF	79.5			
	425	2053		PRESTR CONC BOX BEAM (5B20)(MOD)	LF	159			
	425	2068		PRESTR CONC GIRDER (TX54)	LF	3,282.90			
	428	2001		CONC SURF TREAT (CLASS I)	SY	3,142			
	432	2001		RIPRAP (CONC)(4 IN)	CY	195			
	432	2002		RIPRAP (CONC)(5 IN)	CY	8.6			
	432	2039		RIPRAP (MOW STRIP)(4 IN)	CY	22			
	432	2048		RIPRAP (CONC)(FLUME)	CY	44			
	432	2084		RIPRAP (CONC) (CL B) (4")	CY	7.6			
	442	2005		STR STL (MISCELLANEOUS)	LB	1045			
	442	2048		STRUCTURAL STEEL (MISC NON-BRIDGE)	LB	826			
	450	2077		RAIL (PEDESTRIAN RAIL) (TY PR6)	LF	213			
	450	2079	001	RAIL (TY 3-HD) (SPL)	LF	162			
	450	2121	001	RAIL (PEDESTRIAN RAIL) (TY PR3)	LF	244.1			
	450	2210	001	RAIL (TY T551) (MOD)	LF	3000			
	452	2010		REMOV RAIL (PEDESTRIAN)	LF	255			
	454	2001		SEALED EXPANSION JOINT (4 IN)(SEJ-A)	LF	159			
	460	20047		CMP (GAL STL 18 IN)	LF	32			
	460	2004		CMP (GAL STL 24 IN)	LF	11			
	464	2005		RC PIPE (CL III)(24 IN)	LF	876			
	464	2010		RC PIPE (CL III)(42 IN)	LF	55			
	465	2032		INLET (COMPL) (CURB) (TY 1) (10' X 3')	EA	1			
	465	2092		MANH (COMPL)(TY 1)	EA	6			

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	465	2188		INLET (COMPL)(DROP)(TY Y-1)	EA	6			
	465	2478		INLET (COMPL)(TY RWIR)	EA	1			
	465	2999		INLET (COMPL)(TY M)	EA	1			
	471	2003		GRATE & FRAME	EA	4			
	481	2012		PVC PIPE (SCH 40)(6 IN)	LF	123			
	481	2013		PVC PIPE (SCH 40)(8 IN)	LF	241			
	481	2015		PVC PIPE (SCH 40)(12 IN)	LF	110			
	495	2001		RAISE EXIST STR	EA	1			
	496	2011		REMOV STR (BRIDGE 500-999 FT LENGTH)	EA	1			
	496	2067		REMOV STR (LRG PED BRIDGE) (0-50 FT LENGTH)	EA	1			
	502	2001	033	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	18			
	208	2002		CONSTRUCTING DETOURS	SY	1908			
	512	2004	002	PORT CTB (FUR & INST) (SNGL SLP) (TY 1)	LF	1800			
	512	2008	002	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	1100			
	512	2009	002	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	100			
	512	2022	002	PORT CTB (MOVE)(SNGL SLP) (TY 1)	LF	630			
	512	2026	002	PORT CTB (MOVE)(LOW PROF)(TY 1)	LF	760			
	512	2027	002	PORT CTB (MOVE)(LOW PROF)(TY 2)	LF	200			
	512	2035	002	PORT CTB (STKPL)(LOW PROF)(TY 1)	LF	240			
	512	2040	002	PORT CTB (REMOVE) (SNGL SLP) (TY 1)	LF	1800			
	512	2044	002	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	1100			
	512	2045	002	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	100			
	512	2052	002	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	1322			
	514	2015	002	PERM CONC TRF BARR (F-SHAPE)(TY 1)	LF	443			
	514	2016	002	PERM CONC TRF BARR (F-SHAPE)(TY 2)	LF	30			
	540	2001	031	MTL W-BEAM GD FEN (TIM POST)	LF	873			
	540	2005	031	TERMINAL ANCHOR SECTION	EA	2			
	540	2044	031	DOWNSTREAM ANCHOR TERMINAL (DAT) SECTION	EA	2			
	542	2001		REMOVING METAL BEAM GUARD FENCE	LF	1660			
	542	2002		REMOVING TERMINAL ANCHOR SECTION	EA	1			
	545	2001		CRASH CUSH ATTEN (INSTL)	EA	1			
	545	2002		CRASH CUSH ATTEN (MOVE & RESET)	EA	1			
	545	2003		CRASH CUSH ATTEN (REMOVE)	EA	1			
	545	2049		CRASH CUSH ATTEN (INSTL) (WORK ZONE)	EA	2			

PROJECT NAME: MARKET STREET REALIGNMENT
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ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	545	2051		CRASH CUSH ATTEN (REMOVE) (WORK ZONE)	EA	2			
	610	2064	005	RELOCATE RD IL ASM (TRANS-BASE)	EA	2			
	610	2072	005	REMOVE RDWY ILL ASSEM	EA	30			
	610	2998	005	INS RD IL AM (TY SA) 40S - 6 (.25 KW) S	EA	8			
	610	2999	005	INS RD IL AM (TY SA) 40T - 6 (.25 KW) S	EA	3			
	617	2003	003	TEMP RD IL (TIMBER POLES W/ARMS)	EA	4			
	618	2018		CONDT (PVC) (SCHD 40) (2")	LF	16651			
	618	2035		CONDT (PVC) (SCHD 80) (2") (BORE)	LF	616			
	620	2003	001	ELEC CONDR (NO. 2) BARE	LF	450			
	620	2004	001	ELEC CONDR (NO. 2) INSULATED	LF	900			
	620	2009	001	ELEC CONDR (NO. 6) BARE	LF	1830			
	620	2010	001	ELEC CONDR (NO. 6) INSULATED	LF	3660			
	620	2011	001	ELEC CONDR (NO. 8) BARE	LF	17267			
	620	2012	001	ELEC CONDR (NO. 8) INSULATED	LF	34534			
	624	2007	014	GROUND BOX TY A (122311)	EA	41			
	624	2008	014	GROUND BOX TY A (122311) W / APRON	EA	16			
	628	2101	003	ELC SRV TY D 120 / 240 070 (NS) SS (E) SP (U)	EA	4			
	636	2001	014	ALUMINUM SIGNS (TY A)	SF	70			
	636	2002	014	ALUMINUM SIGNS (TY G)	SF	6			
	636	2003	014	ALUMINUM SIGNS (TY O)	SF	673			
	644	2022		INS SM RD SN SUP&AM TY S80(1) SA(P)	EA	26			
	644	2025		INS SM RD SN SUP&AM TY S80(1) SA(T)	EA	4			
	644	2027		INS SM RD SN SUP&AM TY S80(1) SA(U)	EA	2			
	644	2056		RELOCATE SM RD SN SUP & AM TY 10BWG	EA	3			
	644	2058		RELOCATE SM RD SN SUP & AM TY S80	EA	3			
	644	2060		REMOVE SM RD SN SUP & AM	EA	41			
	647	2001		INSTALL LRSS (STRUCT STEEL)	LB	516			
	647	2002		RELOCATE LRSA	EA	3			
	650	2053		INS OH SN SUP (50 FT BRDG)	EA	2			
	658	2315		INSTL OM ASSM (OM-2Y)(WC) GND	EA	2			
	662	2001		WK ZN PAV MRK NON-REMOV (W) 4" (BRK)	LF	1540			
	662	2002		WK ZN PAV MRK NON-REMOV (W) 4" (DOT)	LF	64			
	662	2004		WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	LF	6825			
	662	2012		WK ZN PAV MRK NON-REMOV (W) 8" (SLD)	LF	3604			

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ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	662	2016		WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	LF	1573			
	662	2017		WK ZN PAV MRK NON-REMOV (W) (ARROW)	EA	31			
	662	2018		WK ZN PAV MRK NON-REMOV (W) (DBL ARROW)	EA	2			
	662	2026		WK ZN PAV MRK NON-REMOV(W)(UTURN ARROW)	EA	2			
	662	2027		WK ZN PAV MRK NON-REMOV (W) (WORD)	EA	20			
	662	2028		WK ZN PAV MRK NON-REMOV (W)18"(YLD TRI)	EA	25			
	662	2030		WK ZN PAV MRK NON-REMOV (Y) 4" (BRK)	LF	60			
	662	2032		WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	LF	6768			
	662	2039		WK ZN PAV MRK NON-REMOV (Y) 24" (SLD)	LF	62			
	662	2064		WK ZN PAV MRK REMOV (W) 4" (BRK)	LF	910			
	662	2067		WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	11926			
	662	2073		WK ZN PAV MRK REMOV (W) 8" (DOT)	LF	24			
	662	2075		WK ZN PAV MRK REMOV (W) 8" (SLD)	LF	5202			
	662	2079		WK ZN PAV MRK REMOV (W) 24" (SLD)	LF	226			
	662	2084		WK ZN PAV MRK REMOV (W) (ARROW)	EA	15			
	662	2085		WK ZN PAV MRK REMOV (W) (DBL ARROW)	EA	8			
	662	2093		WK ZN PAV MRK REMOV (W) (UTURN ARROW)	EA	4			
	662	2094		WK ZN PAV MRK REMOV (W) (WORD)	EA	19			
	662	2095		WK ZN PAV MRK REMOV (W) 18" (YLD TRI)	EA	7			
	662	2099		WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	6011			
	662	2103		WK ZN PAV MRK REMOV (Y) 8" (SLD)	LF	182			
	662	2113		WK ZN PAV MRK SHT TERM (TAB) TY W	EA	1218			
	662	2115		WK ZN PAV MRK SHT TERM (TAB) TY Y-2	EA	458			
	666	2003	014	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	190			
	666	2012	014	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	4287			
	666	2036	014	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	1333			
	666	2048	014	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	489			
	666	2054	014	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	10			
	666	2069	014	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA	2			
	666	2093	014	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL)	EA	2			
	666	2096	014	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	10			
	666	2099	014	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)	EA	25			
	666	2111	014	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF	3512			
	666	2141	014	REFL PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	1			

CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	666	2189	014	PAVEMENT SEALER 4"	LF	7799			
	666	2191	014	PAVEMENT SEALER 8"	LF	1333			
	666	2195	014	PAVEMENT SEALER 24"	LF	489			
	666	2219	014	PAVEMENT SEALER (ARROW)	EA	10			
	666	2220	014	PAVEMENT SEALER (WORD)	EA	10			
	666	2221	014	PAVEMENT SEALER (MED NOSE)	EA	1			
	666	2224	014	PAVEMENT SEALER (DBL ARROW)	EA	2			
	666	2230	014	PAVEMENT SEALER UTURN ARROW	EA	2			
	666	2257	014	PAVEMENT SEALER (YLD TRI)	EA	25			
	672	2017	034	REFL PAV MRKR TY II-C-R	EA	127			
	677	2001	034	ELIM EXT PAV MRK & MRKS (4")	LF	3006			
	677	2003	034	ELIM EXT PAV MRK & MRKS (8")	LF	1158			
	677	2005	034	ELIM EXT PAV MRK & MRKS (12")	LF	450			
	677	2020	034	ELIM EXT PAV MRK & MRKS (36")(YLD TRI)	EA	7			
	690	2024	009	REMOVAL OF SIGNAL HEAD ASSM	EA	1			
	690	2026	009	INSTALL OF SIGNAL HEAD ASSM	EA	1			
	690	2051	009	REMOVAL OF SIGNAL POLE ASSM	EA	1			
	TxDOT SPECIAL SPECIFICATION ITEMS								
	6834	2002	001	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4			
							Total Bid Amount:		

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PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
BID ALTERNATE 1: DIVERSION OF TRAFFIC									
	203.1			TACK COAT	GAL	1076.3			
	205.3			HMA PAVEMENT, TYPE C (2" COMP. DEPTH)	SY	10763			
	208.1			SALV, HAUL & STKPL RCL APH PV (2")	SY	10763			
	535			24 INCH WIDE YELLOW LINE	LF	252			
	535.1			4 INCH WIDE YELLOW LINE	LF	260			
	535.11			COM THRU/LEFT WHITE ARROW	EA	6			
	535.12			WORD "ONLY"	EA	5			
	535.2			4 INCH WIDE WHITE LINE	LF	790			
	535.4			8 INCH WIDE WHITE LINE	LF	1433			
	535.5			12 INCH WIDE WHITE LINE	LF	1669			
	535.7			24 INCH WIDE WHITE LINE	LF	756			
	535.8			RIGHT WHITE ARROW	EA	5			
	535.9			LEFT WHITE ARROW	EA	14			
	537.6			TRAFFIC BUTTON TYPE I-C	EA	19			
	537.8			TRAFFIC BUTTON TYPE II-A-A	EA	14			
	537.9			TRAFFIC BUTTON TYPE II-C-R	EA	116			
	305	2002		SALV, HAUL & STKPL RCL APH PV (0 TO 2")	SY	3336			
	340	2050		D-GR HMA(METH) TY-C PG70-22	TON	367			
	502	2001	033	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	11			
	662	2064		WK ZN PAV MRK REMOV (W) 4" (BRK)	LF	315			
	662	2065		WK ZN PAV MRK REMOV (W) 4" (DOT)	LF	344			
	662	2067		WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	916			
	662	2075		WK ZN PAV MRK REMOV (W) 8" (SLD)	LF	1967			
	662	2084		WK ZN PAV MRK REMOV (W) (ARROW)	EA	251			
	662	2085		WK ZN PAV MRK REMOV (W) (DBL ARROW)	EA	7			
	662	2094		WK ZN PAV MRK REMOV (W) (WORD)	EA	15			
	662	2113		WK ZN PAV MRK SHT TERM (TAB) TY W	EA	185			
	662	2115		WK ZN PAV MRK SHT TERM (TAB) TY Y-2	EA	32			
	666	2003	014	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	160			
	666	2036	014	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	30			
	666	2048	014	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	357			
	666	2111	014	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF	812			
	666	2132	014	REFL PAV MRK TY I (Y) 24"(SLD)(100MIL)	LF	155			

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	666	2141	014	REFL PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	2			
	666	2189	014	PAVEMENT SEALER 4"	LF	972			
	666	2191	014	PAVEMENT SEALER 8"	LF	30			
	666	2195	014	PAVEMENT SEALER 24"	LF	512			
	666	2221	014	PAVEMENT SEALER (MED NOSE)	EA	2			
	672	2012	034	REFL PAV MRKR TY I-C	EA	18			
	672	2015	034	REFL PAV MRKR TY II-A-A	EA	120			
	672	2017	034	REFL PAV MRKR TY II-C-R	EA	3			
	677	2008		ELIM EXT PAV MRK & MRKS (ARROW)	EA	2			
	690	2024	009	REMOVAL OF SIGNAL HEAD ASSM	EA	19			
	690	2026	009	INSTALL OF SIGNAL HEAD ASSM	EA	19			
						Total Bid Amount for Alternate TCP:			
	9017.1	SS		TRAFFIC CONTROL CREDIT DUE TO THE TEMPORARY CLOSURE OF MARKET STREET	LS	1			
						Total Bid Amount for Bid Alternate 1:			

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PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
BID ALTERNATE 2: RETAINING WALL 7 AREA IMPROVEMENTS									
	432 2001			RIPRAP (CONC)(4 IN)	CY	46			
	0416 2004			DRILL SHAFT (36 IN)	LF	138			
	0416 2006			DRILL SHAFT (48 IN)	LF	1166			
	0423 2026			RETAINING WALL (CANT DRILL SHAFT)(FACIA)	SF	2960			
	9006.6	SS		CONTROL WIRE (2-WIRE):	LF	240			
	9006.8	SS		IRRIGATION SLEEVES (LATERALS):	LF	15			
	9006.10	SS		IRRIGATION PRESSURE MAINLINE (2-1/2" SIZE):	LF	240			
	9006.14	SS		IRRIGATION QUICK COUPLING VALVE (1" SIZE):	EA	2			
	9006.16	SS		SUBSURFACE DRIP IRRIGATION:	SF	6659			
	9006.18	SS		DRIP REMOTE CONTROL VALVE:	EA	5			
	9007.4-7	SS		SHRUBS AND GROUNDCOVER	SF	6659			
	9007.8a	SS		SOIL PREP + AMENDMENTS (SHRUB/GROUNDCOVER), 12-18" DEEP	SF	6659			
	9007.9	SS		PLANTING AREA SHEET MULCH	SF	6659			
						Total Bid Amount for Bid Alternate 2:			

City of San Antonio Statement:

_____certifies that the unit prices shown on this complete computer print-out for all of the bid items and the alternates contained in this proposal are the unit prices intended and that its bid will be tabulated using these unit prices and no other information from this print-out.

_____Acknowleged and agrees that the total bid amount shown will be read as its total bid and further agrees that the official total bid amount will be determined by multiplying the unit bid prices shown in this print-out by the respective estimated quantities shown in the proposal and then totaling all of the extended amounts. _____ agrees to the terms, conditions, and requirements of the bidder's bid proposal.

Signed: _____ Date: _____

CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
SAN ANTONIO WATER SYSTEM - WATER									
	100			MOBILIZATION	LS	1			
	101			PREPARATION OF RIGHT OF WAY	LS	1			
	413			FLOWABLE FILL	CY	87.78			
	550			TRENCH EXCAVATION	LF	1808			
	814			12" DI PIPE	LF	204			
	814			24" DI PIPE	LF	1606			
	814			20" DI PIPE	LF	45			
	814			6" DI PIPE	LF	45			
	814			8" DI PIPE	LF	40			
	824			LONG SERVICE	EA	1			
	824			SHORT SERVICE	EA	1			
	828			8" GATE VALVE	EA	2			
	828			12" GATE VALVES	EA	3			
	828			6" GATE VALVE	EA	1			
	828			20" BUTTERFLY VALVE	EA	1			
	830			24" BUTTERFLY VALVE	EA	5			
	831			24" X 24" TEE CUT-IN	EA	2			
	834			FIRE HYDRANT	EA	3			
	836			FITTINGS	TON	12.1			
	840			12" WATER TIE-INS	EA	2			
	840			24" WATER TIE-INS	EA	4			
	841			HYDROSTATIC TESTING	EA	3			
	844			2" TEMPORARY BLOW OFF	EA	1			
	844			4" TEMPORARY BLOW OFF	EA	2			
	846			2" AIR RELEASE VALVE	EA	1			
	856			24" STEEL CASING	LF	20			
	856			42" STEEL CASING	LF	45			
	858			CONCRETE ENCASEMENT	CY	5.8			
	3000			DISPOSAL OF AC PIPE	LF	50			
						Total Water Bid Amount:			

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SAN ANTONIO WATER SYSTEM - SEWER									
	100			MOBILIZATION	LS	1			
	101			PREPARATION OF RIGHT OF WAY	LS	1			
	550			TRENCH EXCAVATION SAFETY PROTECTION	LF	129			
	858			CONCRETE ENCASEMENT	CY	15.4			
	862			SEWER LINE ABANDONMENT	LF	167			
						Total Sewer Bid Amount:			
SAN ANTONIO WATER SYSTEM - RECYCLED WATER									
	100			MOBILIZATION	LS	1			
	101			PREPARING RIGHT OF WAY	LS	1			
	511.2	COSA		ASPHALT PAVEMENT REPLACEMENT, 11" CTB	SY	5			
	550			TRENCH EXCAVATION SAFETY PROTECTION	LF	258			
	818			12" PVC RECYCLED WATER MAIN	LF	258			
	836			PIPE FITTINGS	TON	0.5			
	840			TIE-IN 12"	EA	2			
	841			HYDROSTATIC TEST	EA	1			
	844			2" TEMPORARY BLOW-OFF	EA	1			
	862			ABANDONMENT OF RECYCLED WATER MAIN	LF	342			
							Total Recycled Water Bid Amount:		

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
SAN ANTONIO WATER SYSTEM - CHILLED WATER (CW)									
	LINE "A" & "C": MARKET ST. CHILLED WATER								
	1			20" CHW STEEL PIPE (OPEN CUT)	LF	72			
	2			20" CHW PIPE INSULATION	LF	72			
	3			20" GATE VALVE	EA	2			
	4			20" BUTTERFLY VALVE	EA	2			
	5			30" CHW STEEL PIPE (OPEN CUT)	LF	2484			
	6			30" CHW PIPE PRE-INSULATION	LF	2484			
	7			30" BUTTERFLY VALVE	EA	4			
	8			TRENCH EXCAVATION SAFETY PROTECTION	LF	1242			
	9			TRENCHING, BACKFILLING & COMPACTION	LF	1242			
	10			CONCRETE ANCHOR	EA	4			
	11			30" PIPE STOP (INCLUDE HOT TAPPING)	EA	4			
	12			TIE-IN 30"	EA	4			
	13			2" AIR RELEASE ASSEMBLIES	EA	8			
	14			4" TEMPORARY BLOW-OFF	EA	4			
	15			HYDROSTATIC TEST	EA	2			
	16			CATHODIC PROTECTION	LF	2484			
	17			REINFORCED CONCRETE VAULT	EA	1			
	18			ABANDONMENT OF CHILLED WATER MAIN	LF	1017			
	858			CONCRETE ENCASEMENT	CY	12			
						Line "A" & "C" Subtotal:			

CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	LINE "B": WFR/CHERRY STREET PLANT CHILLED WATER								
	40			20" CHW STEEL PIPE (OPEN CUT)	LF	3264			
	41			20" CHW PIPE PRE-INSULATION	LF	3264			
	42			JACK & BORE 60" DIA	LF	203			
	43			STEEL CASING 60" DIA	LF	213			
	44			20" CHW STEEL CARRIER PIPE	LF	426			
	45			20" CHW CARRIER PIPE INSULATION	LF	426			
	46			20" GATE VALVE	EA	4			
	47			TRENCHING, BACKFILLING & COMPACTION	LF	1632			
	48			TRENCH EXCAVATION SAFETY PROTECTION	LF	1632			
	49			QUICK SETTING FLOWABLE FILL	CY	2000			
	50			24" X 20" HOT TAPPING	EA	2			
	51			30" X 20" HOT TAPPING	EA	2			
	52			2" AIR RELEASE ASSEMBLIES	EA	10			
	53			4" TEMPORARY BLOW-OFF	EA	2			
	54			HYDROSTATIC TEST	EA	2			
	55			CATHODIC PROTECTION	LF	3690			
	56			3" MILL & OVERLAY ASPHALT	SY	440			
	57			ASPHALT PAVEMENT REPLACEMENT	SY	235			
	104	2021		REMOVING CONC (CURB)	LF	819			
	110	2001		EXCAVATION (ROADWAY)	CY	540			
	132	2003	007	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	300			
	340	2011		D-GR HMA(METH) TY-B PG64-22	TON	498			
	400	2008		CUT & RESTORING PAV (ASPH)	SY	701			
	512	2004	002	PORT CTB (FUR & INST)(SNGL SLP)(TY 1)	LF	150			
	512	2008	002	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	1580			
	512	2009	002	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	80			
	512	2040	002	PORT CTB (REMOVE)(SNGL SLP) (TY 1)	LF	150			
	512	2044	002	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	1580			
	512	2045	002	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	80			
	545	2001		CRASH CUSH ATTEN (INSTL)	EA	1			
	545	2003		CRASH CUSH ATTEN (REMOVE)	EA	1			
	644	2058		RELOCATE SM RD SN SUP & AM TY S80	EA	2			
							Line "B" Subtotal:		

Description Codes: SS=Special Specification; COSA=City of San Antonio Specification Item; SAWS=San Antonio Water System Specification Item

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	LINE "D": MARKET STREET CHILLED WATER								
	3			20" GATE VALVE	EA	3			
	5.1			24" CHW STEEL PIPE (OPEN CUT)	LF	24			
	6.1			24" CHW PIPE PRE-INSULATION	LF	24			
	5.2			30" CHW STEEL PIPE (OPEN CUT)	LF	232			
	6.2			30" CHW PIPE PRE-INSULATION	LF	232			
	7			30" BUTTERFLY VALVE	EA	1			
	8			TRENCH EXCAVATION SAFETY PROTECTION	LF	232			
	9			TRENCHING, BACKFILLING, AND COMPACTION	LF	232			
	12.1			TIE-IN 24"	EA	1			
	12.2			TIE-IN 30"	EA	1			
	13			2" AIR RELEASE ASSEMBLIES	EA	1			
	14			4" TEMPORARY BLOW-OFF	EA	1			
	15			HYDROSTATIC TEST	EA	1			
	16			CATHODIC PROTECTION	LF	232			
	18			ABANDONMENT OF CHILLED WATER MAIN	LF	232			
	50			24" X 20" HOT TAPPING	EA	2			
	50.1			TEMPORARY 20" CHW JUMPER PIPE	LF	90			
							Line "D" Subtotal:		
					Line "A", "C", "B" and "D" Subtotal:				
	100			MOBILIZATION	LS	1			
	101			PREPARING RIGHT OF WAY	LS	1			
						Total CW Bid Amount:			

Description Codes: SS=Special Specification; COSA=City of San Antonio Specification Item; SAWS=San Antonio Water System Specification Item

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
SAN ANTONIO WATER SYSTEM - CHILLED WATER (CW)									
	ALTERNATE 1: INSULATION FOR LINE "A" & "C": MARKET ST. CHILLED WATER								
	100			MOBILIZATION	LS	1			
	101			PREPARING RIGHT OF WAY	LS	1			
	30			DEDUCT TRENCHING, BACKFILLING & COMPACTION	LF	1242			
	31			DEDUCT 20 CHW PIPE PRE-INSULATION	LF	72			
	32			DEDUCT 30" CHW PIPE PRE-INSULATION	LF	2484			
	33			DEDUCT CATHODIC PROTECTION	LF	2484			
	34			ADD GILSULATE 500XR INSULATION (MATERIAL ONLY)	CF	29601			
	35			ADD GILSULATE 500XR INSULATION (SHIPPING & HANDLING)	TRUCK	27.6			
	36			ADD GILSULATE 500XR INSULATION (INSTALLATION, COMPLETE)	CF	29601			
						Alt. 1 for Line "A" Bid Amount:			
	ALTERNATE 2: INSULATION FOR LINE "B": WFR/CHERRY STREET PLANT CHILLED WATER								
	100			MOBILIZATION	LS	1			
	101			PREPARING RIGHT OF WAY	LS	1			
	70			DEDUCT TRENCHING, BACKFILLING & COMPACTION	LF	1530			
	71			DEDUCT 20" CHW PIPE PRE-INSULATION	LF	3059.4			
	72			DEDUCT CATHODIC PROTECTION	LF	3059.4			
	73			ADD GILSULATE 500XR INSULATION (MATERIAL ONLY)	CF	20954			
	74			ADD GILSULATE 500XR INSULATION (SHIPPING & HANDLING)	TRUCK	19.4			
	75			ADD GILSULATE 500XR INSULATION (INSTALLATION, COMPLETE)	CF	20954			
						Alt. 2 for Line "B" Bid Amount:			

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
	ALTERNATE 3: INSULATION FOR LINE "D": MARKET STREET CHILLED WATER								
	100			MOBILIZATION	LS	1			
	101			PREPARING RIGHT OF WAY	LS	1			
	30			DEDUCT TRENCHING, BACKFILLING & COMPACTION	LF	232			
	31			DEDUCT 24" CHW PIPE PRE-INSULATION	LF	24			
	32			DEDUCT 30" CHW PIPE PRE-INSULATION	LF	232			
	33			DEDUCT CATHODIC PROTECTION	LF	232			
	34			ADD GILSULATE 500XR INSULATION (MATERIAL ONLY)	CF	2978			
	35			ADD GILSULATE 500XR INSULATION (SHIPPING & HANDLING)	TRUCK	2.7			
	36			ADD GILSULATE 500XR INSULATION (INSTALLATION, COMPLETE)	CF	2978			
						Alt. 3 for Line "D" Bid Amount:			

SAWS Statement:

_____certifies that the unit prices shown on this complete computer print-out for all of the bid items and the alternates contained in this proposal are the unit prices intended and that its bid will be tabulated using these unit prices and no other information from this print-out.

_____Acknowleged and agrees that the total bid amount shown will be read as its total bid and further agrees that the official total bid amount will be determined by multiplying the unit bid prices shown in this print-out by the respective estimated quantities shown in the proposal and then totaling all of the extended amounts. _____ agrees to the terms, conditions, and requirements of the bidder's bid proposal.

PROJECT NAME: MARKET STREET REALIGNMENT
PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
AT&T - UNDERGROUND UTILITY									
	100.1	COSA		MOBILIZATION	LS	1			
	101.1	COSA		PREPARATION OF RIGHT OF WAY	LS	1			
	1			6-4" PVC CONCRETE ENCASED (TELE)	LF	1678			
	2			DIRECTIONAL BORE	LF	784			
	3			TRENCH PROTECTION	LF	874			
	4			MANHOLE 4'x8'x6'	EA	6			
	4			REMOVAL OF EXIST MANHOLE	EA	9			
	5			COPPER INSTALLATION	LF	2275			
	6			FIBER INSTALLATION	LF	2275			
							Total Bid Amount:		

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CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
CPS ELECTRIC									
	100.1	COSA		MOBILIZATION	LS	1			
	101.1	COSA		PREPARATION OF RIGHT OF WAY	LS	1			
	1			CONDUIT CONCRETE ENCASED 12-4" PVC W/3-2" (SCH 40)	L.F.	2579			
	3			TRENCH EXCAVATION	L.F.	2085			
	4			MANHOLE 7'x7'x7' (ELEC)	L.F.	16			
							Total Bid Amount:		

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CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
TIME WARNER AND CITY IT CONDUITS									
	100.1	COSA		MOBILIZATION	LS	1			
	101.1	COSA		PREPARATION OF RIGHT OF WAY	LS	1			
	618.3	COSA		CONDUIT - PVC (SCH 40) INSTALL ONLY	LF	3680			
	618.3	COSA		CONDUIT - PVC (SCH 40) FURNISH AND INSTALL	LF	3680			
	852	SAWS		MANHOLE 4'x4' INSTALL ONLY	EA	2			
	852	SAWS		MANHOLE 4'x4' FURNISH AND INSTALL	EA	3			
	550.1	COSA		TRENCH EXCAVATION PROTECTION	LF	1840			
							Total Bid Amount:		

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CITY OF SAN ANTONIO

025 UNIT PRICING FORM - ADDENDUM 4

PROJECT NAME: MARKET STREET REALIGNMENT

PROJECT NO. 40-00300

ALT. NO.	ITEM NO.	DESC. CODE	S.P. NO	BID ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT BID PRICE	AMOUNT	ITEM SEQUENCE NO.
CPS - GAS									
	100.1	COSA		MOBILIZATION	LS	1			
	101.1	COSA		PREPARATION OF RIGHT OF WAY	LS	1			
	1			INSTALL GAS MAIN OR CASING (DISTANCE AS MEASURED ALONG THE TOP OF TRENCH)					
	1.1			6" PLASTIC PIPE AND TRACER WIRE	LF	145			
	1.2			8" PLASTIC PIPE AND TRACER WIRE	LF	172			
	1.3			12" STEEL PIPE	LF	470			
	2			CONCRETE/FLATWORK	SY	17			
	3			FLOWABLE FILL	CY	195			
	4			CUT AND RESTORE PAVEMENT (TO BE USED AS DIRECTED)	SY	56			
							Total Bid Amount:		

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SECTION 332640

VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

The CONTRACTOR shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all valves and appurtenances shown on the plans and specified herein.

1.02 SCOPE OF WORK

The Work of this section shall include the furnishing, installation, and testing of all valves and appurtenances as specified herein, shown on the plans, and as required to make the facility operable and complete. Items to be provided include, but shall not be limited to the following:

A. Valves

B. Actuators, operators, and valve boxes.

1.03 RELATED WORK

Related Work not included in this section can be found in the following sections:

A. SAWS Specification Item No. 804 – Excavation, Trenching and Backfilling.

1.04 SUBMITTALS

Provide the following in conformance with applicable requirements contained in Section 010300, Submittals.

A. Shop Drawings. Submit shop drawings for valves and miscellaneous components. Shop drawings shall be complete with bill-of-materials showing kind and class of materials and catalog and engineering data showing compliance with the specified requirements.

B. For each type and model of valve provide the following:

1. Assembly instructions and spare parts list.

2. Preventative/corrective maintenance instructions.

3. Certificate of seat exposure with entailed fluid exposure.

C. Erection Drawings. Erection drawings shall include the procedures to be used in setting, supporting, and anchoring the valves, the fitting of the line pipe to the valves for proper coupling, and for adjusting and testing all valve assemblies.

1.05 QUALITY ASSURANCE

All valves and miscellaneous components shall be new, free from defects or contamination, and wherever possible shall be the standard product of the Manufacturer.

1.06 EQUIPMENT STORAGE AND HANDLING

Valves and miscellaneous components shall be handled with equipment designed to prevent damage to the components.

PART 2 - PRODUCTS

2.01 GENERAL

All valves shall be provided as shown in the plans, schedules, and as specified herein. Unless otherwise shown or specified all aboveground valves shall be flanged, screwed, or welded, non-rising stem and handwheel operated. Buried valves shall be mechanical joint, non-rising stem, and wrench operated. The valve assemblies shall be furnished complete and adequate for the specified or shown purpose, and shall include all essential components of equipment, together with all mountings and other appurtenances normal and necessary for proper installation, whether shown or not.

2.02 OPERATORS

A. General. The operators shall be sized based on the maximum expected torque as per valve Manufacturer's recommendations and in no case shall the force required to open or close the valve (i.e., rim pull) exceed 40 pounds. The responsibility for proper operation shall reside with the valve supplier.

B. Manual Operators. Manual operators shall be in compliance with AWWA C504-94 and shall be of the worm gear type and feature a housing that encloses all gearing and can either be buried or is of weatherproof construction for exposed locations. The operator housing shall be constructed of cast iron and shall be permanently grease packed. All housing o-rings, gaskets, and other features shall be designed to ensure permanent watertightness and maintenance free operation. The axis of the worm gear shaft shall remain fixed during operation and stop-limiting devices shall be provided to limit operator travel. Valves scheduled for above ground service shall be equipped with a handwheel. Buried valves shall be equipped with a 2-inch square AWWA operating nut. Suitable Manufacturers include Limitorque, E-I-M, Dezurik, or approved equal.

2.03 VALVE BOXES

The CONTRACTOR shall provide cast-iron valve boxes for each buried valve. Each valve box shall be adjustable to fit the depth of cover over the valve and shall be designed to prevent the transmission of surface loads directly to the valve. Valve boxes shall have an interior diameter of not less than 6 inches and be coated with a bituminous coating 2 mils thick. Valve boxes shall be installed to reserve a minimum of 50% of the adjustment for future extension. Extension sections shall be cast-iron only. All valve boxes shall be constructed to prevent tipping and rattling. Boxes shall be a minimum of 3/16 inch thick as manufactured by Western Iron Works, Alamo Iron Works, US Foundry, or approved equal. All valve boxes installed in paved areas shall be provided with a protective concrete collar as shown in the plans. Valve box covers shall be provided with "RECYCLED WATER" cast into the cover. Square covers shall be provided for all recycled water main valve boxes.

2.04 GATE VALVES

A. Except as otherwise noted or specified herein, AWWA Standard C500-93 shall govern the design, physical and chemical properties of component materials, construction, manufacture and testing of all gate valves furnished for this Specification.

B. All gate valves that have a nominal diameter of 12 inches or less shall be rated at 200 psig. Gate valves that have a nominal diameter of 16 inches or larger shall be rated at 150 psig.

C. Gate valves shall have resilient seats; bronze mounted with non-rising stems and conform to the requirements of AWWA C509. The valve body shall be cast-iron conforming to ASTM A-126, Class B. It shall be designed for installation in either a horizontal or vertical position and shall be furnished for mounting in a horizontal pipeline, unless otherwise specified.

D. Valve components of brass or bronze shall be manufactured to ASTM recognized alloy Specifications of low zinc content bronze, with a maximum zinc content of 16% as shown in AWWA Standard C500-93, Table A.

E. All mechanical joint valves shall be supplied with glands, bolts, and gaskets. Valve body bolts and nuts shall be zinc-plated, ASTM A165 Grade NS, steel grade A307 with dimension conforming to ANSI 8.2.1.

F. All valves for recycled water mains shall open left (counterclockwise), unless otherwise specified.

G. Stem seals shall be of the "O-ring" type for valves less than 20 inches nominal pipe size. "O-ring" or stuffing box may be used for valves 20 inches and larger. Packing, if used in the stuffing box, will be non-asbestos; Teflon lubricated fiber, TFE fluorocarbon low-density cord, a multi-lok brain acrylic yarn or packing material. Packing materials shall be non-deteriorating and non-contaminating. Stuffing box glands for valves 12 inch nominal pipe size and smaller shall be

made of low zinc content bronze. Stuffing box glands for valves 16-inch nominal pipe size and larger shall be cast iron with bushings of low zinc content bronze.

H. Valves 20-inch nominal pipe size and larger shall be geared. Gears shall be cut tooth steel and gear cases shall be the totally enclosed, weathertight type to enclose the gears, stuffing box, and the valve stem, attached to the bonnet.

I. All valves 20 inch nominal pipe size and larger shall be provided with a bypass and bypass valve.

J. Exposed valves shall be shop coated inside with an fusion bonded epoxy coating 10 dry mils thick, which meets or exceeds AWWA C550-90. Buried valves shall be shop coated both inside and outside. Top coatings shall have a minimum dry film thickness of 6-mils and shall consist of TNEMEC Series 140 color Pota Pox Plus or approved equal. Total minimum thickness for exterior coatings on buried valves shall not be less than 6 mils. Top and primer coatings shall be compatible. Exterior color shall be Pantone 522.

K. Approved Manufacturer's of gate valves include:

Sizes Three (3) through Twelve (12) Inch

Approved Manufacturers	Models
American Flow Control	Series 500
Clow Valve Company	2640
Kennedy Valve	Ken-Seal II
M&H Valve Company	4067
Mueller Company	2360 Series Gate Valve
United States Pipe & Foundry Company	A-USPO

2.05 CHECK VALVES – NOT USED

2.06 BUTTERFLY VALVES

A. Except as otherwise modified or supplemented herein, AWWA Standard C504 or the latest revision thereof, shall govern the design, component material construction, manufacture and testing of all butterfly valves. Butterfly valves shall be class 200.

B. Valves furnished under this specification shall be as manufactured by one of the following, or approved equal:

1. American-Darling Valve & Manufacturing Co. - Class ~~150~~ 200.

2. M&H Valve Company - Model 450 & 4500

3. Henry Pratt Company - Groundhog & Triton HP-250

4. Clow Corporation

5. Mueller Company - Lineseal III & Lineseal X

6. Kennedy Valve Manufacturing Company

7. Keystone Valve Company - Fig. 504 and Fig. 47

8. DeZurik AWWA Valve - No. 9239757

9. Cla-Val

C. Valves shall be Class 150B of the short-body type with a 150 psig bi-directional shut-off rating, a 300 psig hydrostatic body shell test and a line velocity rating of 16 feet per second.

D. Valves shall be for mounting on a horizontal pipe with a wrench nut on top. Valves shall be for buried service unless otherwise noted.

E. Valve body shall be of cast iron conforming to ASTM Specification A-126, Class B.

F. Valve body ends shall be flat faced flanged with facing and drilling in accordance with ANSI B16.1, Class 125. All valves shall conform to AWWA C504, Table 2, laying lengths for flanged valves and minimum body shell thickness for all body types.

G. Valve shall be of such design that the disc will seat at 90 degrees with the pipe axis.

H. Valve shall be of such design that the disc will not flutter or vibrate when operated in a throttled position.

I. Valve discs shall be of Cast Iron A48, Cast Iron A126, Class B or Ductile Iron ASTM A536, Grade 65-45-12 and shall be of the disc design to provide 360 degree uninterrupted seating.

J. The valve seat shall be natural or synthetic rubber and may be applied to the disc or body. For valves 30 inches or larger, the rubber seat shall be capable of mechanical adjustment in the field and shall be field replaceable without the need for special tools. Mechanical adjustment or attachment of the seat and seat ring does not include welding. The mating seat surface shall be Type 304 or Type 316 stainless steel, no-chrome or monel. Sprayed or plate mating seat surface are not acceptable.

K. Valve shafts shall be Type 304 stainless steel conforming to ASTM A-276 and shall have a diameter equal to or greater than that shown for Class 150B in Table 3 of AWWA C504. Shafts shall conform to the requirements of Section 3.3, Valves Shaft of AWWA C504 for one-piece or stub shaft types. Connection between the shaft and disc shall be dowel or taper pins, which are mechanically secured.

L. The valve assembly shall be furnished with a factory-set, non-adjustable disc shaft thrust bearing that insures the valve disc is centered within the valve body seat at all times.

M. Valve shaft bearings shall be permanent, self-lubricated, bearings, which provides continuous, low-friction maintenance-free operation. Shaft bearing shall be contained in integral hubs of the valve body.

N. Valve shaft seal shall consist of "O" rings or "vee" ring packing where the shaft projects through the valve body for the actuator connection.

O. The valve shall be provided with a fully enclosed permanently lubricated actuator of the traveling nut or worm gear design. The operator shall be designed such that constant input speed results in variable output speed with slowing down valve closure at the ends of travel. The effect is to maintain the rated output torque throughout the entire travel. The actuator shall be connected to the valve shaft by means of a key and keyway connection.

P. All actuators shall have adjustable, mechanical stop limits in accordance with C504 Section 3.8.2. All 6" - 42" valve actuators shall be capable of withstanding 450 ft-lbs of input torque against the open or closed stops without damage.

Q. Valves for below ground applications shall be provided with an AWWA wrench nut. The wrench nut shall have an arrow cast thereon, indicating the direction of the opening. The wrench nut shall be suitably fastened to the actuator-input shaft. If the shaft is smooth, the wrench nut shall be fastened to the input shaft by means of a 5/16" diameter steel pin passing entirely through the shaft and the wrench nut. Key with keyway will be acceptable. If the shaft is splined, the wrench nut shall be formed to fit the splined shaft. The actuator shall be designed to produce the specified torque with a maximum input of 150 ft-lbs applied to the wrench nut.

R. Valves for above ground applications shall be provided with a handwheel. The handwheel shall have an arrow thereon, indicating the direction of the opening. The handwheel shall be suitably fastened to the actuator-input shaft. Actuators equipped with handwheels shall be designed to produce the specified torque with a maximum pull of 80 pounds of the handwheel rim.

S. The requirement for either wrench nut or handwheel and the direction of opening will be specified on each purchase order.

T. The number of turns to open (close) the valve shall be consistent with each valve size for the manufacturer and shall be approved by the OWNER.

U. All interior wetted ferrous surfaces of the valve, including the disc, shall be shop coated with two coats of epoxy. The epoxy shall have a nominal total thickness of 10 dry mils and shall be in accordance with AWWA C550, latest revision. The exterior surface of the valve shall be shop coated with two coats of epoxy. The epoxy shall have a nominal total thickness of 10 dry mils. The topcoat of epoxy for interior and exterior coated surface shall have a minimum thickness of 6 to a

maximum of 8 dry mils. The topcoat for interior and exterior surface shall be TNEMEC Series 140-color Pota Pox Plus or approved equal. Primer coating shall be compatible with the applied top coating.

V. The supplier/manufacturer shall provide Affidavit of Compliance with applicable sections of AWWA C504 to include the following: Results of ASTM testing procedures and requirements for materials, Manufacturer's Quality Assurance Program, leak-tightness testing and proof of design testing of representative actuators in accordance with AWWA C504 Section 3.8.5.2 as modified herein (450 ft-lbs). Compliance assurance will be required in accordance with AWWA C504 Section 5.1.2 Affidavits. Results of performance tests, proof of design test, AWWA C504 Section 5.2.4, hydrostatic test, leakage test, and Affidavit of Compliance shall be provided with the bid or with the shipping documents and shall be approved by the OWNER.

2.07 AIR AND VACUUM VALVES

A. General. The air and vacuum valve shall be designed in accordance with AWWA C512-92 to allow large quantities of air to escape out of the orifice during filling and to close tight when the liquid enters the valve. It shall also allow large quantities of air to enter the pipeline through the orifice during draining operations. The discharge orifice area shall be equal to or greater than the inlet area of the valve. It shall consist of a body, cover, baffle, float and seat, and shall be rated at the working pressure as shown on the plans.

B. The baffle will be designed to protect the float from direct contact of rushing air and water in order to prevent the float from closing the valve prematurely. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed for maintenance.

C. The float shall be stainless steel and center guided through the guide bushings for positive shutoff into the seat. Valve sizes shall be as shown on the drawings. An isolation valve shall be installed upstream from each air and vacuum valve.

D. The valve body and cover shall be cast iron fabricated in accordance with ASTM A48-35 or ASTM A126 Class B. Inlet sizes through 3 inch shall be screwed (NPT). Pipe sizes above 3 inches shall have flanged inlets (125# ANSI B.16.1). A protective hood or cowl shall be installed on the outlet of the flange-bodied valves.

E. Internal seat trim float arm and pivot pin shall be type 303 or 304 stainless steel. Floats shall be stainless steel ASTM A240 or ASTM A276.

F. Internal seat or orifice button shall be BUNA-N nitrile rubber compounded for water service. Cover gasket shall be composition-type, equal to Armstrong CS-231, Garlock 3000, or Lexide NK-511. Cover bolts shall be alloy steel.

G. Valve body shall have a test pressure rating of 300 psig and working pressure rating of 150 psig or 200 psig as shown on the plans.

H. All air and vacuum valves shall be as manufactured by:

1. APCO Valve Company

2. GA Industries

3. Multiplex Manufacturing Company

4. Val-Matic Manufacturing Company

5. Powerseal Corporation or approved equal

2.08 AIR RELEASE VALVES

A. General. The automatic air release valve shall be designed to operate under a test pressure of 150 psig, and will allow trapped air to escape from a pipeline, pump, tank, or water system. After the air escapes out of the air release valve through the orifice, the valve shall close to prevent water from escaping. The air release valve will then stay closed until more air accumulates and then the cycle repeats itself.

B. The valve body and cover shall be cast iron fabricated in accordance with ASTM A48-35 or ASTM A126 Class B. Inlet sizes through 3 inch shall be screwed (NPT). Pipe sizes above 3 inches shall have flanged inlets (125# ANSI B.16.1). A protective hood or cowl shall be installed on the outlet of the flange-bodied valves.

C. Internal seat trim float arm and pivot pin shall be type 303 or 304 stainless steel. Floats shall be stainless steel ASTM A240 or ASTM A276.

D. Internal seat or orifice button shall be BUNA-N nitrile rubber compounded for water service. Cover gasket shall be composition-type, equal to Armstrong CS-231, Garlock 3000, or Lexide NK-511. Cover bolts shall be alloy steel.

E. Valve body shall have a test pressure rating of 300 psig and working pressure rating of 150 psig.

F. All air release valves shall be as manufactured by:

1. APCO Valve Company

2. GA Industries

3. Multiplex Manufacturing Company

4. Val-Matic Manufacturing Company

5. Powerseal Corporation or approved equal

2.09 COMBINATION AIR VALVES

A. Combination air valves shall provide for both automatic air release under system pressure and to allow air movement during filling or draining operations.

B. The housing shall be designed to incorporate conventional or kinetic flow principles to properly vent the air without premature closure.

C. Flanged size (4 inch and larger) may be furnished in a dual housing. When dual casings are used, a bronze manual isolation valve shall be installed.

D. Suitable Manufacturers include:

1. APCO Valve Company

2. GA Industries

3. Multiplex Manufacturing Company

4. Val-Matic Manufacturing Company

5. Powerseal Corporation or approved equal

2.10 BLOWOFF HYDRANTS

A. Pre-manufactured blowoff hydrants shall be Eclipse No. 85 hydrants as supplied by John C. Kupferle Foundry Company or approved equal. Hydrants shall be self-draining, non-freezing, compression type 2-3/16" main valve opening. Inlet connection shall be 3" MJ. Outlet dimension shall be 2-1/2" NST. Principal interior parts shall be brass and removable from the hydrant without excavating the hydrant.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Valves and valve boxes shall be in true alignment and grade in accordance with the procedures submitted with the shop and erection drawings. All adjustments and operating settings of the valves shall be made in accordance with the procedures and details presented in the erection drawings. All valve boxes and extended bonnets installed in paved areas shall have a concrete collar cast around the box or bonnet once it has been set at proper grade.

B. Buried valves shall be firmly supported in place by foundations to preclude strain on the pipe connections. The valve boxes shall be checked for centering plumb over the wrench nut to ensure that the box cover is flush with the finished grade. Earth backfill shall be carefully tamped around each valve box on all sides to the undisturbed face of the trench wall. Valves shall have their interiors cleaned of all foreign matter before installation. The valves shall be inspected in opened and closed positions to ensure that all parts are in working condition.

C. Aboveground valves shall be rigidly held in place using supports and hangers as shown in the plans. The stem orientation of valves in elevated piping shall be approved by the OWNER for accessibility, but no valve shall have the stem in the downward direction. Saddle type supports shall be provided for all valves located in vaults. Supports shall be of rugged construction providing at least 120 degrees under support for the valve body. All supports shall be anchored to concrete foundations using type 316 stainless steel anchor bolts.

3.02 PROTECTIVE COATINGS

All interior non-working ferrous surfaces (other than stainless steel), and interior waterway passages shall be given shop applied epoxy coatings. The interior waterway passages of all valves shall be given a shop applied coating system unless provided with a fusion bonded epoxy coating. The exterior surfaces, unless provided with a fusion bonded epoxy coating shall be given a shop prime coating, with finish exterior coating applied in the field. Exterior coatings shall be shop applied epoxy coatings with a minimum thickness of 10 mils. Topcoats shall be a minimum of 6 mils and shall consist of TNEMEC Series 140 color Pota Pox Plus or approved equal. Primer coat shall be compatible with the topcoat.

3.03 TESTS

A. Shop and Laboratory Tests. Perform shop and laboratory tests on valves and appurtenances as follows:

1. Gate Valves - Perform shop tests in accordance with AWWA C500-93, except no leakage shall occur with design pressure held for one minute.

2. Butterfly Valves - The following applies to all sizes up to 48 inches in diameter:

a. Material Tests - Physical and chemical properties tests shall be performed on all material components to be used in the Manufacture of butterfly valves in accordance with AWWA C504-94, including valve seat bearing materials.

b. Gear Operator Tests - Manufacturer shall test each model of gear operator and establish torque-rating curves in accordance with AWWA C504-94.

c. Performance Tests - Manufacturer shall shop test each butterfly valve for performance, leakage, and hydrostatic pressure in accordance with AWWA C504-94. Results of these tests shall be submitted in accordance with Section 01300, Submittals.

B. Field-Tests. Test all valves and appurtenances for proper operating adjustments and settings and for freedom from vibration, binding, scraping, and other defects. The adequacy of all pipe hangers, pipe supports, and valve supports to meet

specified requirements shall be verified. Upon installation all valves shall be field tested hydrostatically for 2 hours in the presence of the OWNER.

END OF SECTION

SECTION 336313

UNDERGROUND CHILLED WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes underground piping outside the building for distribution of chilled water.

1.3 DEFINITIONS

A. HP Systems: High-pressure piping operating at more than 15 psig as required by ASME B31.1.

B. LP Systems: Low-pressure piping operating at 15 psig or less as required by ASME B31.9.

1.4 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing chilled water piping systems with the minimum working-pressure ratings of 200 psi.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Conduit piping.
2. Loose-fill insulation in accordance with ASTMD-1895. (Alternate)

B. Shop Drawings: For underground chilled water distribution piping. Signed and sealed by a qualified professional engineer.

1. Calculate requirements for expansion compensation for underground piping.
2. ~~Show expansion compensators, offsets, and loops with appropriate materials to allow piping movement in the required locations~~. Show anchors and guides that restrain piping movement with calculated loads, and show concrete thrust block dimensions.
3. Show pipe sizes, locations, and elevations. Show piping in trench with details showing clearances between piping, and show insulation thickness.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from ~~steam~~ chilled water distribution piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of 1 inch equals 20 feet and at vertical scale of 1 inch equals 10 feet. Indicate vaults and piping. Show types, sizes, materials, and elevations of other utilities crossing distribution piping.

C. Qualification Data: For qualified Installer.

D. Welding certificates.

E. Material Test Reports: For conduit piping.

F. Source quality-control reports.

G. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Comply with provisions in ASME B31.9, "Building Services Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping" for materials, products, and installation.

C. ASME Compliance: Safety valves and pressure vessels shall bear appropriate ASME labels.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner no fewer than 14 days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Owner's written permission.

1.9 COORDINATION

A. Coordinate pipe-fitting pressure classes with products specified in related Sections.

PART 2 - PRODUCTS

2.1 STEEL PIPES AND FITTINGS

A. Steel Pipe shall be shall be ASTM 53, Grade B, standard weight, 200 psi, 0.25 inch minimum wall thickness, polyurethane AWWA C222 or epoxy per C210 lined interior, per AWWA C210, 1 mm exterior prime-coat or 8 to 12 mils liquid epoxy coating.

B. Steel Welding Fittings: ASME B16.9, seamless or welded.

1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Nipples: ASTM A 733, Standard Weight, seamless, carbon-steel pipe complying with ASTM A 53/A 53M.

D. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

E. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

2.2 CONDUIT PIPING SYSTEM

~~A. Conduit Piping System: Factory-fabricated and -assembled, airtight and watertight, drainable, pressure-tested piping with conduit, inner pipe supports, and insulated carrier piping. Fabricate so insulation can be dried in place by forcing dry air through conduit~~.

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Insul-Tek Piping Systems, Inc.
2. Perma-Pipe, Inc.
3. Rovanco Piping Systems, Inc.
4. Thermacor Process, L.P.

B. Carrier Pipe: Material as indicated in "Piping Application" Article.

Carrier Pipe Insulation:

~~1. Calcium Silicate Pipe Insulation: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.~~

a. Bands: ASTM A 666, Type 304, stainless steel, 3/4 inch wide, 0.020 inch thick.

1. Polyisocyanurate Foam Pipe Insulation: Un-faced, preformed, rigid cellular polyisocyanurate material intended for use as thermal insulation.

   a. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F at 75 deg F after 180 days of aging.
   b. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches as tested by ASTM E 84.
   c. Fabricate shapes according to ASTM C 450 and ASTM C 585.

2. Polyurethane Foam Pipe Insulation: Unfaced, preformed, rigid cellular polyurethane material intended for use as thermal insulation.

   a. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F at 75 deg F after 180 days of aging.
   b. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches as tested by ASTM E 84.
   c. Fabricate shapes according to ASTM C 450 and ASTM C 585.

C. Minimum Clearance:

1. Between Carrier Pipe Insulation and Conduit: 1 inch.
1. Between Insulation of Multiple Carrier Pipes: 3/16 inch.
2. Between Bottom of Carrier Pipe Insulation and Conduit: 1 inch.
2. Between Bottom of Bare, Carrier Pipe and Casing: 2 inches.

D. Conduit: Spiral wound, steel.

1. Finish: With two coats of fusion bonded epoxy, minimum 40 mils thick.
2. Cover: With polyurethane foam insulation with an HDPE jacket; thickness indicated in "Piping Application" Article.
3. Piping Supports within Conduit: Corrugated galvanized steel with a maximum spacing of 10 feet.
3. Fittings: Factory fabricated and insulated elbows and tees. Elbows may be bent pipe equal to carrier pipe. Tees shall be factory fabricated and insulated, and shall be compatible with the carrier pipe.
4. Expansion Offsets and Loops: Size casing to contain piping expansion.
4. Accessories include the following:

   a. Guides and Anchors: Steel plate welded to carrier pipes and to casing, complete with vent and drainage openings inside casing.
   b. End Seals: Steel plate welded to carrier pipes and to casing, complete with drain and vent openings on vertical centerline.
   c. Gland Seals: Packed stuffing box and gland follower mounted on steel plate, welded to end of casing, permitting axial movement of carrier piping, with drain and vent connections on vertical centerline.

~~b. Joint Kit: Half-shell, pourable or split insulation and shrink-wrap sleeve.~~

~~E. Source Quality Control: Factory test the conduit to 15 psig for a minimum of two minutes with no change in pressure. Factory test the carrier pipe to 150 percent of the operating pressure of system. Furnish test certificates.~~

2.2 LOOSE-FILL INSULATION (Alternate)

A. Granular, Loose-Fill Insulation: Inorganic, nontoxic, nonflammable, sodium potassium aluminum silicate with calcium carbonate filler. Include chemical treatment that renders insulation hydrophobic.

1. Manufacturers: Subject to compliance with requirements:

a. Gilsulate International, Inc.

2. Thermal Conductivity (k-Value): 0.60 at 175 deg F and 0.65 at 300 deg F.
3. Application Temperature Range: 35 to 800 deg F.
4. Dry Density: 40 to 42 lb/cu. ft.
5. Strength: 12,000 lb/sq. ft.

PART 3 - EXECUTION

3.1 EARTHWORK

A. See SAWS construction specification Item 804 – Excavation, Trenching and Backfill.

3.2 PIPING APPLICATION

A. Chilled Water Piping:

1. 20” diameter pipe and larger shall be ASTM 53, Grade B, standard weight, 200 psi, 0.25 inch minimum wall thickness, polyurethane AWWA C222 or epoxy per C210 lined interior, per AWWA C210, 1 mm exterior prime-coat or 8 to 12 mils liquid epoxy coating.

2. 30” diameter pipe shall conform to AWWA C200 and AWWA M-11, 200 psi, 0.25 inch wall, polyurethane AWWA C222 or epoxy per C210 lined interior, 1 mm exterior prime coat or 8 to 12 mils liquid epoxy coating.

3. Provide factory pre-insulated fitting of forged, long radius bends, beveled for butt welding, having a wall thickness equal to the pipe.

4. Piping Insulation Thickness: 2 inches.

5. Piping with granular, loose-fill insulation (Alternate).

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Remove standing water in the bottom of trench.

C. Bed the pipe on a minimum 6-inch layer of granular fill material with a minimum 6-inch clearance between the pipes.

D. Do not insulate piping or backfill piping trench until field quality-control testing has been completed and results approved.

E. Install piping at uniform grade of 0.2 percent downward in direction of flow or as indicated.

~~F. In conduits, install drain valves at low points and manual air vents at high points.~~

F. Install components with pressure rating equal to or greater than system operating pressure.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Secure anchors with concrete thrust blocks. Concrete is specified in SAWS Item 300 – Concrete (Natural Aggregate).

3.4 LOOSE-FILL INSULATION INSTALLATION (Alternate)

A. Do not disturb the bottom of trench; otherwise, compact and stabilize it to ensure proper support.

B. Remove standing water in the bottom of trench.

C. Bed the pipe on a minimum 6-inch layer of granular fill material with a minimum 6-inch clearance between the pipes.

D. Form insulation trench by excavation or by installing drywall side forms to establish the required height and width of the insulation.

E. Support piping with proper pitch, separation, and clearance to backfill or side forms using temporary supporting devices that can be removed after back filling with insulation.

F. Place insulation and backfill after field quality-control testing has been completed and results approved.

G. Apply bitumastic coating to carbon-steel anchors and guides. Pour concrete thrust blocks and anchors. See SAWS HEM 300 – Concrete (Natural Aggregate) for concrete and reinforcement.

H. Wrap piping at expansion loops and offsets with mineral-wool insulation of thickness appropriate for calculated expansion amount.

I. Pour loose-fill insulation to required dimension agitating insulation to eliminate voids around piping.

J. Remove temporary hangers and supports.

K. Cover loose-fill insulation with polyethylene sheet a minimum of 4 mils thick, and empty loose-fill insulation bags on top.

L. Manually backfill 6 inches of clean backfill. If mechanical compaction is required, manually backfill to 12 inches before using mechanical-compaction equipment.

3.5 JOINT CONSTRUCTION

A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

E. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

F. Conduit Piping Joints: Assemble sections and finish joints with pourable or split insulation, exterior jacket sleeve, and apply shrink-wrap seals.

3.6 IDENTIFICATION

A. Install continuous plastic underground warning tapes during back filling of trenches for underground chilled water distribution piping. Locate tapes 6 to 8 inches below finished grade, directly over piping.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Prepare chilled water piping for testing according to ASME B31.1 and ASME B31.9 and as follows:

a. Leave joints, including welds, un-insulated and exposed for examination during test.
b. Isolate equipment. Do not subject equipment to test pressure.
c. Install relief valve set at pressure no more than one-third higher than test pressure.
d. Fill system with temperature water. Where there is risk of freezing, air or a safe, compatible liquid may be used.
e. Use vents installed at high points to release trapped air while filling system. Use drip legs installed at low points for complete removal of liquid.

2. Test chilled water piping as follows:

a. Subject ~~steam and condensate~~ chilled water piping to hydrostatic test pressure that is not less than 1.5 times the design pressure.
b. After hydrostatic test pressure has been applied for 10 minutes, examine joints for leakage. Remake leaking joints using new materials and repeat hydrostatic test until no leaks exist.

3. Test conduit as follows:

a. Seal vents and drains and subject conduit to 15 psig for four hours with no loss of pressure. Repair leaks and retest as required.

E. Prepare test and inspection reports, and submit reports to owner.

END OF SECTION